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AIRLIFT REACTORS: APPLICATIONS IN WASTEWATER TREATMENT

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Abstract

The excessive release of pollutants in the environment leads to the development of several processes and equipments for treatment of compounds with impact on the environment and human health. Airlift reactors (ALRs) proved to be efficient alternatives devices against conventional system (stirred tank, bubble column contactors) for the remediation of several contaminated media, even more because their applications range from synthesis of chemicals, culture of plant and animal cells, production of microalgae, treatment of wastewater, flue gas, contaminated soils.

This paper analyses the applications and some performances of ALRs for wastewater treatment, addressing the influence of hydrodynamics, reactor geometry, design and configuration on the pollutants removal efficiency and energy saving. The specific characteristics of internal and external loop airlifts are discriminated for some wastewater treatment processes. The analysis reveals that ALRs are feasible alternatives as wastewater treatment systems due to some significant advantages such as: simple design and construction, no moving part, good mixing, low energy requirements, low operation cost, low contamination risk, no heat generation, easy sterilization, and low shear stress to cells. Moreover, these systems are effective for physical, chemical, electrochemical, and biological wastewater treatment. Finally, some aspects regarding the performances of ALRs compared to STRs and BCs in pollutants removal are included.

Key words: biodesulfurization biological treatment, hydrodynamics, microorganisms, pneumatic reactor, sludge

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